REMARKS

The Office Action of December 27, 2004, has been reviewed and the Examiner's comments have been carefully considered. Claims 1, 2, 4-22, 24-28, 30-49, and 57-114 are pending in the application.

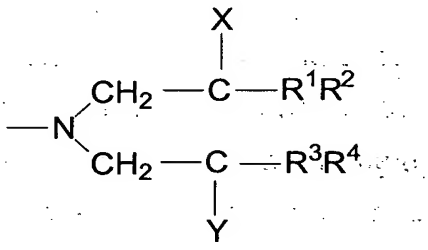
Rejections

Claims 1, 2, 4-22, 24, 26-28, and 30-48 were rejected under 35 U.S.C. §103(a) as being unpatentable over JP 2000-281943A in view of either Faul et al. (US 5,258,460) or Schupp et al. (US 5,096,555) and either Takata et al. (US 4,670,994) or Laver (US 6,197,861 B1). The Examiner asserts that the Japanese reference discloses a high weatherability electrodeposited paint composition and method, comprising all the steps as claimed. The Examiner concedes that the reference is deficient in that there is no teaching of terminal or pendant amino groups on the polymeric backbones. The Examiner relies on either Faul or Schupp for a teaching of terminal and pendant amino groups on electrodepositable resins, and asserts that it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Japanese reference's teachings as suggested by either Faul or Schupp because the selection of any of known equivalent cationic amine salt group-containing resins would have been within the level of ordinary skill in the art.

The Examiner relies on Takata et al. for a teaching that it is known to use a burner with high air to fuel ratio to reduce the formation of tar-like substances caused in part by the reaction of volatile components from a coating composition with combustion products such as NO_x. The Examiner relies alternatively on Laver for a teaching that it is known that the attack of NO_x in the burner gases or ovens on components of paint binders causes formation of yellow breakdown products. The Examiner concludes that it would have been obvious to one of ordinary skill in the art to modify the Japanese reference's teachings as shown by either Takata et al. or Laver by baking coating films in an atmosphere of reduced NO_x because this would result in less amounts of by-products formed from the reaction of NO_x with the binder.

Applicants respectfully disagree with the Examiner's rejection and conclusions regarding the above claims. Applicants submit that the basis on which the claims were rejected is not a valid rejection under 35 U. S. C. §103(a). If one were to combine the whole teachings of the Japanese reference, and Schupp or Faul with the whole teaching of either Takata et al. or Laver, one would not arrive at the present invention as claimed.

The present invention is drawn to an improvement to a process for coating an electroconductive substrate, the improvement comprising the presence in the curable electrodepositable coating composition of one or more cationic amine salt group-containing resins wherein the amine salt groups are derived from pendant and/or terminal amino groups having the following structure:



wherein R^1, R^2, R^3, and R^4 are the same or different, and each independently represents H or C_1 to C_4 alkyl; and X and Y can be the same or different, and each independently represents a hydroxyl group or an amino group; and wherein the coated substrate formed in step (a) is heated in a curing oven in the presence of NO_x in a range of 5 parts per million or less to a temperature and for a time sufficient to cure the electrodeposited coating on the substrate. The resultant coating exhibits substantially no interlayer delamination between the cured electrodeposited coating and the cured top coat upon concentrated solar spectral irradiance exposure.

As mentioned earlier, the Japanese reference discloses a high weatherability electrodeposited paint composition and method. Schupp and Faul demonstrate terminal and pendant amino groups on electrodepositable resins. Takata et al. is relied upon by the Examiner for the teaching that it is known to use a burner with high air to fuel ratio to reduce the formation of tar-

like substances caused in part by the reaction of volatile components from a coating composition with combustion products such as NO_x. The Examiner cites the paragraph bridging columns 1 and 2 of Takata et al. However, later in the same paragraph, Takata et al. indicates that such measures significantly increase the running cost. Takata et al. offers a separate solution to prevent formation of tar-like substances, thereby teaching away from using a burner with a high air to fuel ratio, the teaching relied upon by the Examiner in the rejection. Takata et al. offers a method for heating a hot air circulating-type furnace for baking and drying coatings on articles. The method involves alternately supplying circulating air to a drying chamber from a hot combustion gas stream and from gas heated in a heat exchanger. While Takata et al. may infer that combustion products such as NO_x may detrimentally affect coating compositions cured in gas-fired furnaces, there is no teaching or suggestion in the reference of heating a coated substrate in a curing oven in the presence of NO_x in a range of 5 parts per million or less, as is recited in the present claims.

Laver is relied upon by the Examiner for the teaching that it is known that the attack of NO_x in the burner gases or ovens on components of paint binders causes formation of yellow breakdown products. The Examiner cites column 1, lines 7-12 of Laver. However, Laver discloses coating compositions containing spiroindane compounds in order to solve the problem. The spiroindane compounds serve as stabilizers by preventing attack by NO_x on components of paint binders, thereby alleviating yellowing problems. There is no teaching or suggestion in the Laver reference of heating a coated substrate in a curing oven in the presence of NO_x in a range of 5 parts per million or less, as is recited in the present claims. No advantages are recognized by the reference of the use of a low NO_x atmosphere. Laver instead chooses to alleviate any problems caused by NO_x by incorporating spiroindanes into coating compositions.

None of the references, taken alone or in any combination, teach or suggest the method of the present invention, i. e., a method of coating an electroconductive substrate using the composition recited above, including the step of heating in a curing oven in the presence of NO_x in a range of 5 parts

per million or less, as recited in the present claims. No advantages are recognized by the references of the use of a low NO_x atmosphere as recited in the claims. In contrast, in the process of the present invention, there is a distinct advantage noted to heating the substrate in a low NO_x atmosphere. As shown in Table 1 of the Specification and in amended Table 2, there are marked improvements in adhesion, in particular intercoat adhesion for coatings cured in an electric (low NO_x) oven compared to a gas oven, in processes of the present invention.

Claims 25 and 49 were rejected under 35 U.S.C. §103(a) as being unpatentable over JP 2000-281943A in view of either Faul et al. or Schupp et al. and Takata et al. or Laver as above, and further in view of Armstrong. The Examiner relies on Armstrong for a teaching of the use of yttrium in an electrodeposition process. The Examiner concludes that "the subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the references' teachings as suggested by Armstrong because this would result in a coated substrate with high resistance to corrosion."

Applicants respectfully disagree with the Examiner's rejection and conclusions regarding claims 25 and 49. Armstrong does nothing to overcome the fundamental deficiencies of other references in teaching the present invention. There is no teaching or suggestion in Armstrong that heating in a low NO_x atmosphere would be effective for improving adhesion of an electrodeposited coating composition. The references taken alone or in combination fail to teach the method of the present invention.

It is believed that Applicants' claims are patentable over the prior art. None of the references, taken alone or in any combination, teach or suggest a process for coating an electroconductive substrate as is recited in the present claims.

CONCLUSION

For the reasons given above, it is respectfully submitted that the present response overcomes all of the prior art of record. A Notice of Allowance is respectfully requested at an early date.

Respectfully submitted,

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